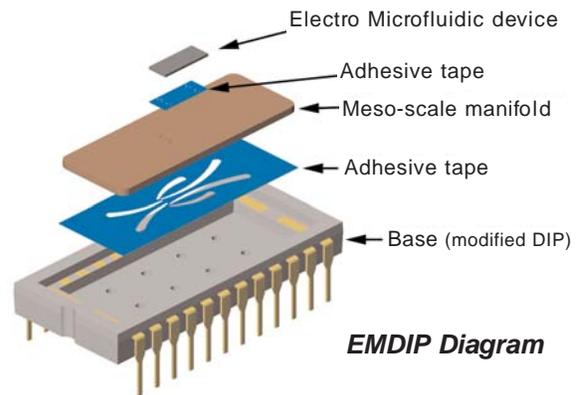


# Electro Microfluidic Dual In-line Package (EMDIP)

## Manufacturing Technologies

Microfluidics is experiencing explosive growth in new product developments. Already there are many commercial applications for electro microfluidic devices such as chemical sensors, biological sensors, and drop ejectors for both printing and chemical analysis. The number of surface micromachined microfluidic devices is likely to increase. Manufacturing efficiency and integration of microfluidics with electronics will become important. In order to realize applications for these devices, an efficient method for packaging microfluidic devices is needed. Responding to this need, researchers at Sandia developed the Electro Microfluidic Dual In-Line Package (EMDIP) and the Fluidic Printed Wiring Board (FPWB).

EMDIP is an inexpensive packaging method for silicon based electro microfluidic devices. This package is durable, modular, easy to handle, and easy to install. The Laboratory Directed Research and Development (LDRD) program funded the development of this technology. The goal of this research was to develop a standard package that was inexpensive and would fit the needs for different silicon based electro microfluidic devices.



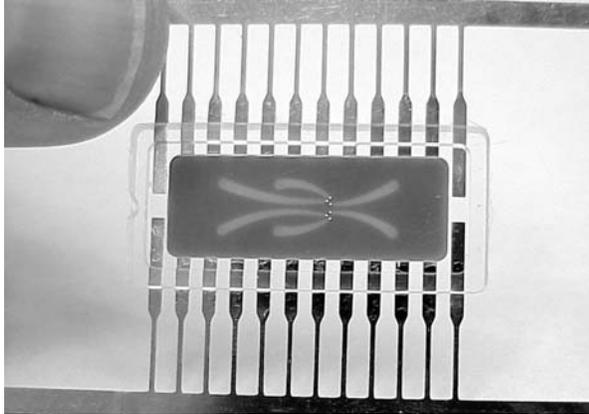
**EMDIP Diagram**

### Capabilities

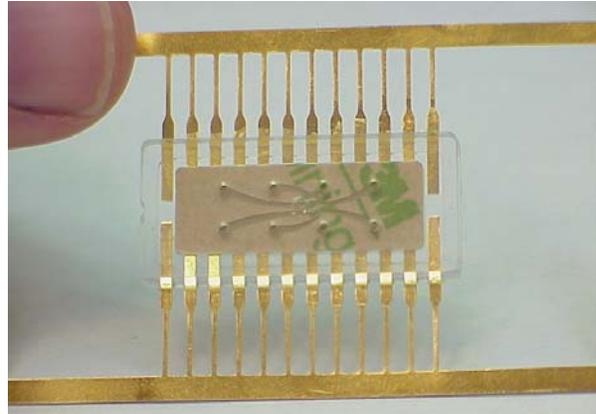
This patent pending technology allows for electrical connections on the top side of the silicon devices and fluidic connections on the bottom side as part of the assembly process. The technology has many beneficial features. For instance, EMDIP:

- is inexpensive and can be manufactured through an automated process,
- can be adopted as a standard,
- is durable, easy to handle, easy to install, and
- includes a great selection of package materials for better fluid compatibility.

This technology has been built and tested.



*EMDIP, top view*



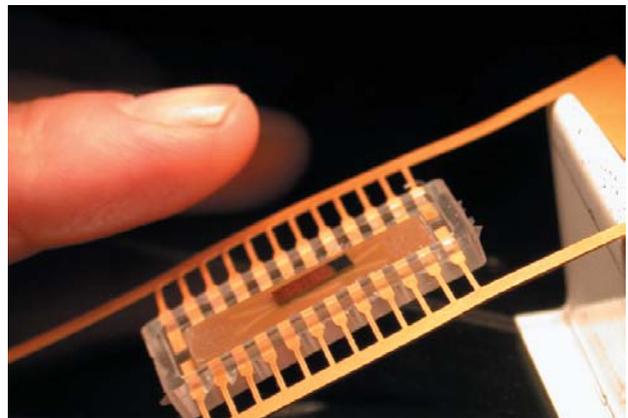
*EMDIP, bottom view*

Currently, there is no standardized package for silicon based electro microfluidic devices available in the marketplace.

### Accomplishments

Accomplishments concerning EMDIP's development include the following:

- Selecting and fabricating an electro-microfluidic IC.
- Selecting plastic for EMDIP because of its low cost and ability to make better fluidic seals and connections.
- Conceptualizing a standardized design that has the fluidic connection along a known pattern, which is analogous to the electrical components found on a DIP package.
- Designing and fabricating EMDIP.
- Pressure testing the EMDIP package.



*Electro Microfluidic IC attached to EMDIP*

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